

X-Ray Diffraction and Fluorescence Instrument for Mineralogical Analysis at the Lunar Surface, Phase II

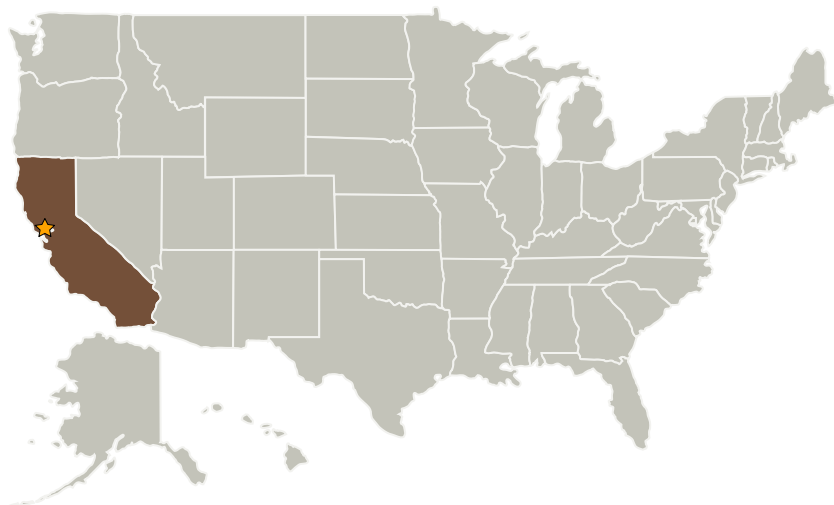
Completed Technology Project (2009 - 2011)



Project Introduction

We propose to develop LUNA, a compact and lightweight X-Ray Diffraction (XRD) / X-Ray Fluorescence (XRF) instrument for mineralogical analysis of regolith, rock samples and dust, in lunar surface exploration. LUNA is based from the concept of CheMin, the XRD/XRF instrument of MSL, but is redesigned to provide a more compact unit at much reduced costs. Many details of LUNA derive from the designs of a small portable XRD/XRF instruments developed and marketed by inXitu. Bringing LUNA to TRL 6-7 is possible within the scope of this Phase II because key components have been or are being developed. Phase 2 addresses the missing critical subsystems: a low-cost flight-qualifiable X-ray CCD, and flight-qualifiable electronics to drive the detector and control the instrument. LUNA is not frozen in a particular geometry or mechanical implementation, it is meant to be flexible to answer the specific needs of any lunar mission. Transmission or reflection geometries are possible as demonstrated by inXitu's commercial instruments. Phase 2 will demonstrate a reflection version of LUNA operating under vacuum. This work leverages on the extensive experience of the PI and the company with XRD-XRF instrumentation in terrestrial and planetary applications.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
inXitu, Inc.	Supporting Organization	Industry	Mountain View, California

Primary U.S. Work Locations

California

Project Transitions

**December 2009:** Project Start**December 2011:** Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.2 Atomic and Molecular Species Assessment